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2 **CLAIMS**

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4 1. A web content adaptation method comprising:
5 analyzing one or more functions associated with a webpage; and
6 adapting the webpage for presentation on a device based on said analyzing.

7

8 2. The method of claim 1, wherein said analyzing comprises generating
9 one or more function-based object models that represent objects comprising the
10 webpage.

11

12 3. The method of claim 2, wherein said generating comprises:
13 identifying one or more basic objects associated with the webpage, basic
14 objects comprising a smallest information body that cannot be further divided; and
15 identifying one or more composite objects associated with the webpage,
16 composite objects comprising objects that contain other objects.

17

18 4. The method of claim 1, wherein said adapting comprises doing so in
19 view of one or more networking conditions.

20

21 5. The method of claim 1, wherein said adapting comprises doing so in
22 view of one or more user preferences.

1 6. A web content adaptation method comprising:
2 analyzing one or more functions associated with a webpage that is
3 configured for presentation within a first client environment; and
4 based on said analyzing, adapting the webpage for presentation within a
5 second client environment that is different from the first client environment.

6
7 7. The method of claim 6, wherein said analyzing comprises generating
8 one or more function-based object models that represent objects comprising the
9 webpage.

10
11 8. The method of claim 7, wherein said generating comprises:
12 identifying one or more basic objects associated with the webpage, basic
13 objects comprising a smallest information body that cannot be further divided; and
14 identifying one or more composite objects associated with the webpage,
15 composite objects comprising objects that contain other objects.

16
17 9. The method of claim 8, wherein said generating further comprises
18 generating said one or more function-based object models as a function of
19 properties that are associated with said one or more basic objects and said one or
20 more composite objects.

21
22 10. The method of claim 9, wherein said adapting comprises applying
23 one or more rules to said one or more function-based object models.

1 **11.** The method of claim 6, wherein said first and second client
2 environments pertain to different client devices.

3
4 **12.** The method of claim 6, wherein said first and second client
5 environments pertain to different types of client devices.

6
7 **13.** The method of claim 6, wherein said first and second client
8 environments pertain to different network conditions.

9
10 **14.** The method of claim 6, wherein said first and second client
11 environments pertain to different user preferences.

12
13 **15.** One or more computer-readable media having computer-readable
14 instructions thereon which, when executed by one or more processors, cause the
15 one or more processors to implement the method of claim 6.

1 16. A web content adaptation method comprising:

2 analyzing one or more functions associated with a webpage that is
3 configured for presentation on a first device type, said analyzing being performed
4 by generating one or more function-based object models that represent objects
5 comprising the webpage,

6 said objects comprising:

7 one or more basic objects associated with the webpage, basic
8 objects comprising a smallest information body that cannot be
9 further divided, said one or more basic objects being configured to
10 perform one or more of the following functions: (1) providing
11 semantic information, (1) navigating to other objects, (3) providing a
12 visual effect on the webpage, and (4) enabling user interaction; and

13 one or more composite objects associated with the webpage,
14 composite objects comprising objects that contain other objects, said
15 one or more composite objects having a clustering function that is
16 associated with a webpage author's intention; and

17 based on said analyzing, adapting the webpage for presentation on a second
18 device type that is different from the first device type.

19
20 17. The method of claim 16, wherein said generating of the one or more
21 function-based object models comprises generating multiple function-based object
22 models each of which being generated as a function of multiple different
23 properties that can be associated with associated objects.

1 **18.** The method of claim 16, wherein said generating of the one or more
2 function-based object models comprises generating at least one function-based
3 object model for a basic object, said at least one function-based object model
4 being generated as a function of one or more of the following properties: (1) a
5 presentation property that defines a way in which the object is presented, (2) a
6 semanteme property associated with content of an object, (3) a decoration property
7 pertaining to an extent to which the basic objects serves to decorate the webpage,
8 (4) a hyperlink property pertaining to an object to which the basic object points via
9 a hyperlink, and (5) a interaction property pertaining to an interaction method of
10 the basic object.

11
12 **19.** The method of claim 16, wherein said generating of the one or more
13 function-based object models comprises generating at least one function-based
14 object model for a composite object, said at least one function-based object model
15 being generated as a function of one or more of the following properties: (1) a
16 clustering relationship property pertaining to a relationship among root children of
17 the composite object, and (2) a presentation relationship property pertaining to a
18 presentation order associated with the root children of the composite object.

19
20 **20.** The method of claim 16, wherein said generating of the one or more
21 function-based object models comprises generating at least one specific function-
22 based object model that serves to categorize an object.

1 **21.** The method of claim 20, wherein said generating of said at least one
2 specific function-based object model comprises, for a basic object, generating said
3 at least one specific function-based object model based upon properties of the
4 basic object and properties associated with any father or brother objects.

5
6 **22.** The method of claim 20, wherein said generating of said at least one
7 specific function-based object model comprises, for a composite object, generating
8 said at least one specific function-based object model based upon properties of the
9 composite object and any of its root children.

10
11 **23.** The method of claim 20, wherein said generating of said at least one
12 specific function-based object model comprises using a rule-based decision tree to
13 ascertain a category of an object.

14
15 **24.** The method of claim 16, wherein said adapting comprises applying
16 one or more rules to said function-based object models.

17
18 **25.** One or more computer-readable media having computer-readable
19 instructions thereon which, when executed by one or more processors, cause the
20 one or more processors to implement the method of claim 16.

1 **26.** A web content adaptation method comprising:

2 analyzing one or more functions associated with a webpage by generating
3 one or more function-based object models that represent objects comprising the
4 webpage,

5 said objects comprising:

6 one or more basic objects associated with the webpage, basic
7 objects comprising a smallest information body that cannot be
8 further divided, said one or more basic objects being configured to
9 perform one or more of the following functions: (1) providing
10 semantic information, (1) navigating to other objects, (3) providing a
11 visual effect on the webpage, and (4) enabling user interaction; and

12 one or more composite objects associated with the webpage,
13 composite objects comprising objects that contain other objects, said
14 one or more composite objects having a clustering function that is
15 associated with a webpage author's intention; and

16 based on said analyzing, adapting the webpage for presentation on a device.

17
18 **27.** The method of claim 26, wherein said adapting comprises doing so

19 in view of one or more networking conditions.

20
21 **28.** The method of claim 26, wherein said adapting comprises doing so

22 in view of one or more user preferences.

1 29. One or more computer-readable media having computer-readable
2 instructions thereon which, when executed by one or more processors, cause the
3 one or more processors to:

4 analyze one or more functions associated with a webpage that is configured
5 for presentation on a first device type by generating one or more function-based
6 object models that represent objects comprising the webpage,

7 said objects comprising:

8 one or more basic objects associated with the webpage, basic
9 objects comprising a smallest information body that cannot be
10 further divided, said one or more basic objects being configured to
11 perform one or more of the following functions: (1) providing
12 semantic information, (1) navigating to other objects, (3) providing a
13 visual effect on the webpage, and (4) enabling user interaction; and

14 one or more composite objects associated with the webpage,
15 composite objects comprising objects that contain other objects, said
16 one or more composite objects having a clustering function that is
17 associated with a webpage author's intention;

18 said generating of the one or more function-based object models
19 comprising generating at least one function-based object model for a basic
20 object, said at least one function-based object model being generated as a
21 function of one or more of the following properties: (1) a presentation
22 property that defines a way in which the object is presented, (2) a
23 semanteme property associated with content of an object, (3) a decoration
24 property pertaining to an extent to which the basic objects serves to
25 decorate the webpage, (4) a hyperlink property pertaining to an object to

1 which the basic object points via a hyperlink, and (5) a interaction property
2 pertaining to an interaction method of the basic object;

3 said generating further comprising generating at least one function-
4 based object model for a composite object, said at least one function-based
5 object model for the composite object being generated as a function of one
6 or more of the following properties: (1) a clustering relationship property
7 pertaining to a relationship among root children of the composite object,
8 and (2) a presentation relationship property pertaining to a presentation
9 order associated with the root children of the composite object;

10 said generating further comprising generating at least one specific
11 function-based object model that serves to categorize an object by:

12 for a basic object, generating said at least one specific
13 function-based object model based upon properties of the basic object and
14 properties associated with any father or brother objects; and

15 for a composite object, generating said at least one specific
16 function-based object model based upon properties of the composite object
17 and any of its root children; and

18 based upon an analysis of said one or more functions, adapt the webpage
19 for presentation on a second device type that is different from the first device type.

20
21 **30.** The one or more computer-readable media of claim 29, wherein said
22 instructions cause the one or more processors to adapt the webpage for
23 presentation on a WAP-enabled device.

1 **31.** A web content adaptation method comprising:
2 receiving multiple web pages that are configured for display on a first
3 device type;
4 processing the multiple web pages to provide multiple different objects
5 associated with the webpages, individual objects having one or more properties
6 relating to functions of the individual object;

7 applying one or more rules to the objects sufficient to provide multiple
8 different webpages that are configured for display on a second device type that is
9 different from the first device type.

10
11 **32.** The method of claim 31, wherein the individual objects can have a
12 presentation property that defines a way in which the object is presented.

13
14 **33.** The method of claim 31, wherein the individual objects can have a
15 semanteme property associated with the content of an object.

16
17 **34.** The method of claim 31, wherein the individual objects can have a
18 decoration property pertaining to the extent to which an object serves to decorate a
19 webpage.

20
21 **35.** The method of claim 31, wherein the individual objects can have a
22 hyperlink property pertaining to an object to which another object points via a
23 hyperlink.

1 **36.** The method of claim 31, wherein the individual objects can have a
2 interaction property pertaining to an interaction method of an object.

3
4 **37.** The method of claim 31, wherein the individual objects can have a
5 clustering relationship property pertaining to a relationship among any root
6 children of an object.

7
8 **38.** The method of claim 31, wherein the individual objects can have a
9 presentation relationship property pertaining to a presentation order associated
10 with any root children of an object.

11
12 **39.** The method of claim 31, wherein said processing comprises
13 defining a representation of an object that includes any children of said object.

14
15 **40.** The method of claim 31, wherein said processing comprises
16 assigning a category to one or more objects.

17
18 **41.** The method of claim 40, wherein said assigning comprises using a
19 rule-based decision tree to ascertain a category for said one or more objects.

1 **42.** The method of claim 40, wherein said assigning comprises
2 assigning a category from a set of object categories comprising: (1) an information
3 object that presents content information, (2) a navigation object that provides a
4 navigation function, (3) an interaction object that provides for user interaction, (4)
5 a decoration object that serves a decoration function, (5) a special function object
6 that performs a defined function, and (6) a page object that is associated with
7 presentation of related information.

8

9 **43.** A web content adaptation method that adapts web content from one
10 format to another, and which uses multiple function-based object models to do so,
11 where the function-based object models comprise models that pertain to (1) basic
12 objects that comprise a smallest information body that cannot be further divided,
13 and (2) composite objects that comprise objects that can contain other objects.

14

15 **44.** The web content adaptation method of claim 43, wherein the
16 function-based object models are generated as a function of one or more properties
17 associated with the objects.

18

19 **45.** A system for adapting web content from one format to another
20 comprising one or more function-based object models, individual function-based
21 object models representing objects that are present in a webpage in terms of one or
22 more of an object's functional properties.

1 **46.** The system of claim 45, wherein one of the properties comprises a
2 presentation property that defines a way in which the object is presented.

3
4 **47.** The system of claim 45, wherein one of the properties comprises a
5 semanteme property associated with the content of an object.

6
7 **48.** The system of claim 45, wherein one of the properties comprises a
8 decoration property pertaining to the extent to which an object serves to decorate a
9 webpage.

10
11 **49.** The system of claim 45, wherein one of the properties comprises a
12 hyperlink property pertaining to an object to which another object points via a
13 hyperlink.

14
15 **50.** The system of claim 45, wherein one of the properties comprises a
16 interaction property pertaining to an interaction method of an object.

17
18 **51.** The system of claim 45, wherein one of the properties comprises a
19 clustering relationship property pertaining to a relationship among any root
20 children of an object.

21
22 **52.** The system of claim 45, wherein one of the properties comprises a
23 presentation relationship property pertaining to a presentation order associated
24 with any root children of an object.

1 **53.** Software code embodied on a computer-readable medium that
2 implements the system of claim 45.

3
4 **54.** A computer architecture for use in adapting web content for display
5 on a computing device, the architecture comprising:

6 an analysis module for receiving at least one webpage and processing the
7 one webpage to produce one or more function-based object models that describe
8 functional properties of objects that are contained in the one webpage;

9 one or more rules modules that contain rules that are to be used to adapt
10 content contained in the webpage; and

11 a content adaptation module configured to process the one or more
12 function-based object models in accordance with one or more rules contained in
13 the one or more rules modules to produce a new web page that has been adapted
14 from the one web page.

15
16 **55.** The computer architecture of claim 54, wherein the content
17 adaptation module is configured to produce a new web page for display on a
18 WAP-enabled device.

19
20 **56.** The computer architecture of claim 54, wherein said analysis
21 module is configured to produce function-based object models that pertain to both
22 basic objects and composite objects,

23 basic objects comprising a smallest information body that cannot be further
24 divided; and

25 composite objects comprising objects that contain other objects.

1
2 **57.** The computer architecture of claim 56, wherein said analysis
3 module is configured to produce, for basic objects, function-based object models
4 that comprise values associated with the following properties: (1) a presentation
5 property that defines a way in which the object is presented, (2) a semanteme
6 property associated with content of an object, (3) a decoration property pertaining
7 to an extent to which the basic objects serves to decorate the webpage, (4) a
8 hyperlink property pertaining to an object to which the basic object points via a
9 hyperlink, and (5) a interaction property pertaining to an interaction method of the
10 basic object.

11
12 **58.** The computer architecture of claim 56, wherein said analysis
13 module is configured to produce, for composite objects, function-based object
14 models that comprise values associated with the following properties: (1) a
15 clustering relationship property pertaining to a relationship among root children of
16 the composite object, and (2) a presentation relationship property pertaining to a
17 presentation order associated with the root children of the composite object.